

CASE STUDY 7

Energy-saving technology in new terminal

Who: Hamburg Airport

Where: Germany

What: A range of energy saving measures in the new Terminal 1

When: 2005

Why: Emissions reduction and cost saving

Project

Hamburg Airport made environmental efficiency a top priority in designing its new Terminal 1 building. Externally it is almost identical to the existing Terminal 2, but close attention was paid to the latest environmentally friendly technology during its design and construction.

Terminal 1 uses a water-based cooling system which is around 15% more efficient than an air-based system due to the substantially better heat transfer and storage characteristics of water. Another important feature is the 'thermo-labyrinth', a system to pre-heat outside air in winter and pre-cool summer outside air.

Summer and winter benefits

In summer, floor cooling in the departure halls ensures comfortable temperatures. The terminal's ceiling is fitted with so-called cooling beams, through which water flows collecting excess heat from these spaces. Using water to cool the space is more efficient than cooling incoming and re-circulating air. In winter, warm water circulates through the same system to ensure year-round comfortable temperatures.



Hamburg Airport Terminal 1

The thermo-labyrinth takes advantage of the fact that the temperature of the ground 12 metres underneath the terminal building fluctuates less than the air temperature. In summer, the ground is generally cooler than the atmosphere and in winter the ground is warmer. By transferring ground heat to pre-warm incoming winter air and, conversely, by transferring heat from in-coming summer air to the cooler ground, the thermo-labyrinth reduces the annual energy needs of Terminal 1 by 1,450 MWh.

Furthermore, in Terminal 1, all water needs in the toilets and washroom facilities are met by an energy-saving rainwater utilisation system.

Other energy efficiency initiatives

All energy savings at an airport ultimately reduce the emissions of carbon dioxide and other greenhouse gases. Further examples at Hamburg Airport include the aircraft hangar "H" and the main boiler system.

- At hangar H, heating and lighting energy requirements were reduced by a combination of lowering the heating circulation temperature of the floor heating, reassessing illumination needs and streamlining the opening and closing of the large hangar doors.
- The main boiler system on the airport was modernised to increase output with gas blowpipe burners and a new regulating system. The system maximises the use of electricity generated as a by-product of heat production, reducing the need for electricity sourced externally.

Long term

In upcoming years, energy efficiency will be improved by 15-20% across the airport. For that purpose, weak points regarding heating and cooling requirements are checked, alternative energy supply systems are analysed, movement sensors are applied, setpoint values for heating, cooling and lighting are tightened.



Company profile:

Hamburg is Germany's fourth largest airport, with nearly 12 million passengers a year passing through.

In 2006 it handled around 168,000 aircraft movements and 80,000 tonnes of cargo.

The Hamburg Airport site sits on 500 hectares and has around 200 buildings, 13,000 employees and is home to some 250 companies.

www.ham.airport.de